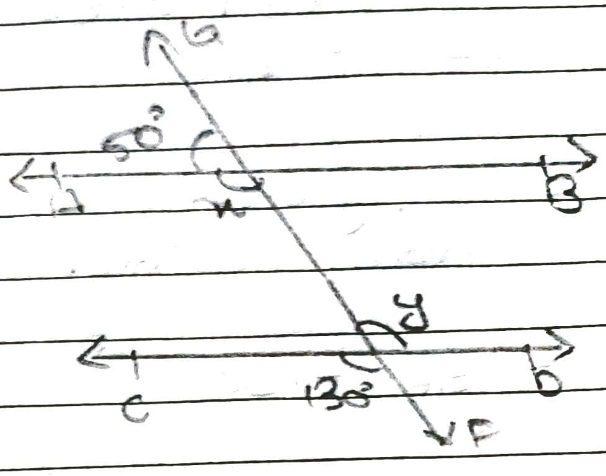
Exercise 6.2

1. In fig. 6.28; find the value of x and y and then show that AB || CD.



→ $x + 50° = 180°$ (linear pair)

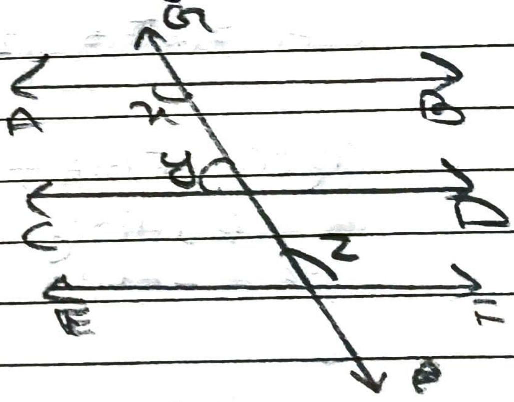
$x = 130°$

$y = 130°$ (vertically opposite angle)

$x = y = 130°$ (alternate interior angles are equal in two parallel lines)

Thus, AB || CD.

2. In fig 6.29, if AB || CD, CD || EF and $y:z = 3:7$, find x.



→ $x + y = 180°$ (transversal)

$o = z$ (corresponding ∠s)

$y + o = 180°$ (linear pair)

$y + z = 180°$ (from above)

Now, let $y = 3w$, $z = 7w$ ($y:z = 3:7$)

$3w + 7w = 180°$

$10w = 180°$

$w = 18°$

Now, $y = \cancel{18°}\ 3 \times 18° = 54°$

$z = 7 \times 18° = 126°$

From equation ① we get

$\Rightarrow x + y = 180^\circ$

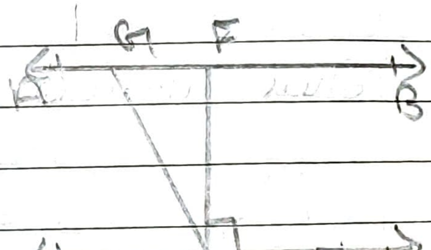
$\Rightarrow x + 54^\circ = 180^\circ$

$\Rightarrow x = 126^\circ$

3. In fig. 6.30, if $AB \parallel CD$, $EF \perp CD$ and $GED = 126^\circ$, find AGE and FGE.

→ $GED = 126^\circ$

$GED = AGE = 126^\circ$
(alternate angle interior ∠s)



Also,

$GED = GEF + FED$

As $EF \perp CD$, $FED = 90^\circ$

$\therefore GED = GEF + 90^\circ$

or $GEF = 126^\circ - 90^\circ = 36^\circ$

Again, $FGE + GED = 180^\circ$ (Transversal)
Putting the value of $GED = 126^\circ$, we get,

$FGE = 54^\circ$

So,

$AGE = 126^\circ$

$GEF = 36^\circ$ and

$FGE = 54^\circ$

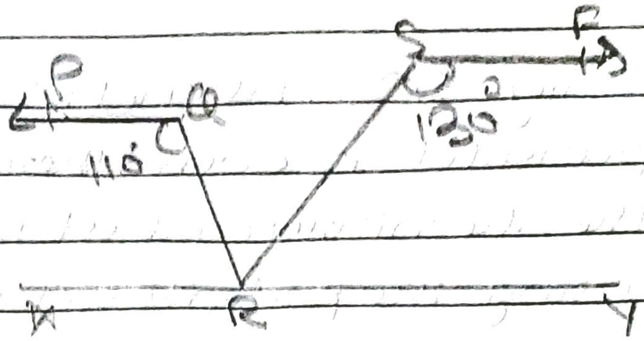
4. In fig. 6.31, if $PQ \parallel ST$, $\angle PQR = 110^\circ$ and $RST = 130^\circ$, find QRS.
(Hint to line parallel to ST through point R.

→ Construct a line XY parallel to PQ.

PQR + QRX = 180° (transversal)

QRX = 180° − 110°

QRX = 70°



Similarly,

RST + SRY = 180°

SRY = 180° − 130°

∴ SRY = 50°

The linear pairs on the line XY-

QRX + QRS + SRY = 180°

Putting their respective values, we get,

QRS = 180° − 70° − 50°

QRS = 60°

5. In fig. 6.32, if AB ∥ CD, APQ = 50° and PRD = 127°, find x and y.

→ APQ = PQR (alternate interior angle)

Putting the values of APQ = 50° and PQR = x we get,

x = 50°

APR = PRD (A.I.A)

APR = 127° (given)

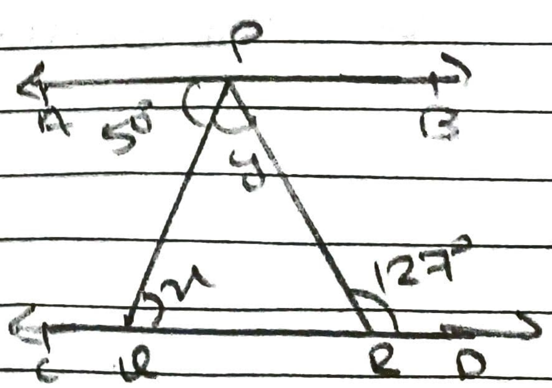
APR = APQ + QPR

Putting value of QPR = y

and APR = 127°, we get,

127° = 50° + y

y = 77°

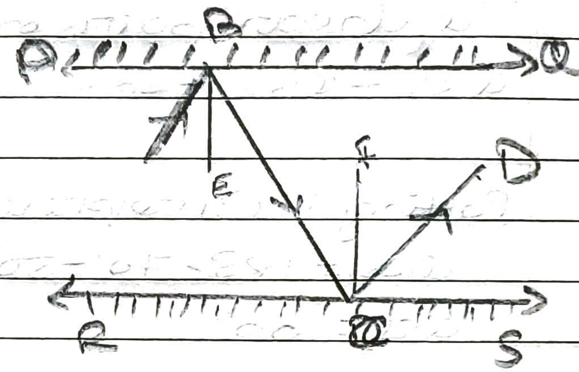


Thus, the values of x and y are calculated as:
$x = 50^\circ$ and $y = 77^\circ$

6. In fig. 6.33, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strike the the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB ∥ CD

– Draw two lines BE and CF such that BE ⊥ PQ and CF ⊥ RS.

Since PQ ∥ RS
BE ∥ CF



Angle of incidence = Angle of reflection

So, 1 = 2 and
3 = 4

2 = 3 (alternate interior angles)
1 + 2 = 3 + 4
ABC = DCB

So, AB ∥ CD (alternate interior angles are equal).